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XV.—*Note on Delias belladonna of Fabricius.*

By H. J. ELWES.

IN the 'Annals' for January 1885 Mr. Butler has written on this species and described two new forms allied to it; but as his conclusions are, to my mind, quite erroneous, I should like to make some remarks upon them.

In the above instance it seems that Mr. Butler, having found, in a collection made by Mr. Horne in the North-west Provinces of India, a specimen of a *Delias* which in some points resembles Donovan's figure of *D. belladonna*, assumes that this form represents the type. He then goes on to say—"I think therefore that we may conclude that *Delias belladonna* is a species confined to the North-west Provinces, that *D. Horsfieldii* is confined to Nepal, and that other forms allied to these may yet be expected to turn up." He then describes two forms which immediately did turn up as "sp. novæ," one from Barrackpore and the other from Darjiling. He concludes by saying that "females in this group appear to be very rare; of the four species here mentioned we only have male examples in the British Museum."

On reading this note I referred first of all to the British Museum collection and then to my own, hoping to get a better knowledge of this species; and I found that, as regards the two supposed new species, there is no good evidence as to their distinctness or habitat, but, further, that Donovan's figure does not represent exactly any Indian form of the species, that *D. Horsfieldii* is not confined to Nepal, and that Hewitson's collection does contain a female of one of the forms.

First as to the type of *belladonna*. It is clear that when a species varies extremely and the local varieties are not constant it is difficult, if not impossible, to fix the exact type of an old description of Fabricius, this difficulty being increased when we do not know whence the described insect came.

As, however, all the forms of this species are, so far as we know, confined in India to the Himalayas, and no collections from the Himalayas are known to have reached Europe in Fabricius's time, whereas many Chinese insects had been brought to Europe, it would be reasonable to suppose that if a form of *belladonna* occurs in China, and resembles Donovan's plate (which, however, in some respects is evidently inaccurate), the Chinese form would be most probably typical. When, therefore, I found in Dr. Staudinger's collection a specimen from China which did fairly agree with this plate, I

thought it was, to say the least of it, premature to conclude that the species was confined to the North-west Provinces, by which, in this case, I suppose Mr. Butler means the Himalayan provinces of Kumaon and Gurwhal. And I should here say that the form which he described as *D. ithiela* from Penang is only known from the Himalayas, and that if *D. Hearseyi* occurs at Barrackpore it was probably brought there from some Himalayan station, for there is no evidence that any form of this species occurs anywhere in the plains of Bengal or the North-west Provinces.

As my own collection is richer in this group than those under Mr. Butler's charge, I will here give the facts, so far as I can at present judge of them, supplementing them by a letter which I received from Mr. De Nicéville, of Calcutta, in answer to my inquiries on the subject.

I possess the following specimens, which appear to me to represent three distinct but closely allied and variable forms; but these may possibly be shown by increased material from Nepal and Western China to be undefinable, though typical specimens of the three races can be recognized.

Delias belladonna.

Delias belladonna, Fab. Ent. Syst. iii. p. 180 (1793); Don. Nat. Rep. i. t. xxxv. (1823).

I have one male, taken by Abbé David at Moupin or in some neighbouring locality in Western Szechuen, and one male from Tsekon, in East Tibet, received from M. Oberthür. The latter gentleman informs me that he has one male and one female from Moupin, two males from Tsekon, seven males from Attentse (E. Tibet), and one male and one female from E. Tibet, without precise locality; none of these individuals are, however, exactly like the figure in Donovan, and the two which I possess resemble so closely the figure of Gray (*Horsfieldii*) that I can see no reason to distinguish them.

If, therefore, any insect does exist which is distinct from the Himalayan *Horsfieldii* and like Donovan's plate, I should expect it to be found in the mountainous regions of South-western China, perhaps near Canton; but I am not able at present to see that there is sufficient evidence of such a fact, as the exact locality of Dr. Staudinger's specimen is uncertain and Donovan's plate is of doubtful accuracy.

Delias Horsfieldii.

Delias Horsfieldii, Gray, Zool. Misc. i. p. 32; Insects of Nepal, pl. viii. fig. 2.

= *D. Hearseyi* et *Boyleæ*, Butler, Ann. & Mag. Nat. Hist. 1885, xv. p. 58.

Var. ? *ithiela*, Butler, Ann. & Mag. Nat. Hist. 1869, iv. p. 242.

Of this I have seven males, taken by my native collector in the interior of Sikkim, which are very black and represent *ithiela* of Butler; four of them have no yellow at all on the upper surface, three have more or less on both surfaces of the anal angle of the hind wings.

Three males from Nepal, bought out of a large collection sent from Khatmandu, which agree with Gray's plate; also one specimen from Wilson's Darjiling collection, and one from the Abbé David, which come next and agree fairly in the amount of yellow on the hind wing. One from Nepal which has the least yellow comes very near that specimen of *ithiela* which has the most; but, like the Moupin and one other Nepal and one Sikkim specimen, these four are much browner in tint than the first seven specimens.

Four females from Wilson's Sikkim collection which may belong to the black *ithiela*, but are much nearer in tint to the browner Nepal and Moupin specimens. These agree in the shape of the fore wing, which is broader than in the males, but differ in the colour of the abdominal margin, which in one specimen is all black like the male *ithiela*, in one has a shade of yellow like some specimens of the same, and in the other two has more or less white on the upper surface, but is yellow like the others beneath.

Then I have six males and five females from the Mandra plateau, 8500 feet high, in Kulu, taken Sept. 3rd, and three males from Hocking's Kangra collection, which agree very fairly in general character, having more white on the wings than the Sikkim and Nepal specimens, and in the male an almost uniform amount of yellow on the abdominal margin. The females, which agree in having broader fore wings, are yellowish white or white on the abdominal margin. The palest of them differs little from the darkest of

Delias sanaca, Moore, Cat. Lep. E. I. Co. Mus. p. 79 (1857);
P. Z. S. 1857, pl. xlv. fig. 4,

of which I have two males from Gurwhal (*Lidderdale*) and two males and one female from Simla (*Marshall*), taken in May. All these differ more or less, but agree in being generally paler than the Kulu specimens, which, again, are paler than those from Nepal, which are paler than the extreme black Sikkim males.

It seems as though some influence affected the coloration of the group, which is strongest in the warm damp climate of Sikkim, and becomes gradually fainter towards the north-west.

I could separate all these thirty-five specimens, of which

ten are female, into three forms; but until resident collectors have shown us whether these forms breed true to their type, and how far seasonal or climatic influences affect them, I cannot say that they are distinct species.

With regard to the habits of this species we know little or nothing; but I am informed by Captain Young that *D. sanaca*, or more probably *D. Horsfeldii*, is common in the Kangra valley, 3000 to 4000 ft. (probably its western limit), in April. In Kulu, at 3500 to 4000 ft., a few come out in April and May, and another brood in autumn. He has also taken it as high as 8500 ft. in September; but this is very unusual. The pupæ are grey and yellow and are attached to bare rocks.

Mr. Otto Möller says of *belladonna* and its allies, in a letter dated December 7, 1885:—"I believe them to be all only geographical varieties of one species. Both the form with and without yellow at the anal angle occur together here in Sikkim from 2000 to 9000 ft. I have only two females, one taken at 8000, the other at 9000 ft."

Mr. De Nicéville says, in a letter dated December 1, 1885:—"Mr. Butler states in his paper that Donovan's figure represents a male. I am of opinion, and Major Marshall concurs with me, that it is far more probably that of a female. The fore wing is broader than is usual among males of this group, and the outer margin of the wing evenly convex; in nearly all males it is more or less concave; the stoutness of the abdomen would also probably indicate a female*.

"In the Indian Museum, Calcutta, are six females of *D. belladonna*—one from Kulu (*Graham Young*), one from Kotghur, near Simla (*De Nicéville*), one from Simla (ditto), one from Daffa hills, and two without locality. The one from Daffa hills has no yellow whatever on the abdominal margin or at anal angle of hind wing; the former is sordid white: the Kulu and Kotghur specimens have a good deal of yellow mixed with white; the Simla example has the barest trace of yellow, the abdominal area being nearly pure white; the two without locality have very large patches of chrome-yellow (in the others the yellow is of a more clear gamboge shade) at the anal angle extending to first median interspace. These latter agree best with Donovan's figure, which, however, differs from all specimens I have seen in having two distinct well-separated spots on the submedian interspace; in all yellow-marked specimens there is a large undivided yellow streak between the veins from near the middle of the wing to the anal angle.

* The abdomen figured by Donovan is unlike any specimen I have seen and may not have belonged to the insect.

"*D. sanaca* seems a good species. I have one female from Fagu, near Simla (about 7000 to 8000 ft.).

"As regards the males, there is every variety from specimens with the abdominal area and anal angles entirely black, to others with the white and yellow extending as far as the median and postmedian veins. Mr. Möller tells me that he has taken both these forms in Sikkim in one sweep of the net; but, as far as my experience goes, the entirely black form never occurs in the N.W. Himalayas. My own idea is that there are three good species of this group:—*D. belladonna*, West China to Kulu; *D. sanaca*, Western Himalaya; *D. belucha*, Beluchistan.

"As to species of this group being found at Penang or Barrackpore, I should as soon expect to find wild zebras in those localities as examples of *Delias* allied to *belladonna*."

The evidence I have brought forward, based as it is on the examination of specimens ten times more numerous than Mr. Butler's and with authentic localities, and the opinions of three naturalists in India who know the species in life, seem to me so strong against every one of Mr. Butler's conclusions, that it is to be hoped he will in future refrain from adding to his very numerous and scattered writings of this character until he has ample material and accurate observations on which to base his opinions.

PROCEEDINGS OF LEARNED SOCIETIES.

DUBLIN MICROSCOPICAL CLUB.

January 18, 1885.

Irish Bog-butter.—Dr. Frazer directed the notice of the Club to the microscopic appearance of a specimen of bog-butter obtained in the form of a large irregular-shaped mass from Mouncha Bog, near Belfast. When examined in a molten condition it showed the cow's hairs so invariably detected in all the examples of Irish bog-butter yet investigated; and in this case there were also observed well-preserved fragments of *Sphagnum* moss in all portions of the fatty matter taken from the outer part of the mass. It was clearly entitled to be considered a true butter, and its sojourn in bog was evidenced by the coating of *Sphagnum*, now noticed for the first time.

A seemingly undescribed *Phycochromaceous Alga* from Pump-water.—Mr. Archer drew attention to an Algal production taken from the well of a pump, forming to the naked eye an appearance like ground coffee distributed pretty thickly in the water, the little bodies composing the mass being of a brownish mahogany-like colour. These, viewed under a moderate amplification, proved to